Notes on the Trematode Genera *Cleidodiscus* and *Urocleidus*

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THE monogenetic trematode genus *Cleidodiscus* Mueller, 1934, is one of approximately 50 genera included in the subfamily Ancyrocephalinae. Descriptive work within this subfamily began for North America when Van Cleave and Mueller (1932) described *Cleidodiscus aculeatus* from the gills of *Stizostedion vitreum.*

The Ancyrocephalinae have long been in a state of taxonomic disorder. One of the major reasons for this unsettled condition has been the tendency of some workers to base new genera and species on anatomical features of insufficient magnitude.

Between 1934 and 1938, J. F. Mueller proposed nine genera of Ancyrocephalinae (then called Tetraonchinae), namely *Actinocleidus, Aristocleidus, Cleidodiscus, Haplocleidus, Leptocleidus, Onchocleidus, Pterocleidus, Tetracleidus,* and *Urocleidus.* Mizelle and Hughes (1938) reduced these nine genera to three, *Actinocleidus, Cleidodiscus,* and *Urocleidus. Actinocleidus,* with articulated haptoral bars and cirri with basally articulated accessory pieces, appears to be a valid genus. *Cleidodiscus* and *Urocleidus,* however, are not so well differentiated, and require a close comparison.

Generic diagnoses are quoted below from Mizelle *et al.* (1956).

Cleidodiscus Mueller, 1934

Synonyms: *Leptocleidus* Mueller, 1936, in part; *Tetracleidus* Mueller, 1936, in part.

Diagnosis: Tetraonchinae (Ancyrocephalinae) somewhat flattened dorsoventrally and with trunk narrowly elliptical in outline (dorsal view). Eyes four, one pair larger than, and posterior to, the other. Gut bifurcate, without diverticula; rami confluent posteriorly. Gonads near middle of body. Cirrus usually a simple cuticularized tube. Accessory piece always present and generally articulated with the cirrus. Vagina usually present and opening on left margin near mid-length of trunk (the vagina is dextral in *C. banghami;* see Mizelle 1940). Vitellaria consisting or numerous, small, discrete follicles arranged in a pair of lateral bands extending from the pharynegeal region to, or into, the peduncle; the bands always posteriorly, and sometimes anteriorly, confluent. Haptor generally distinct, discoidal or subhexagonal; armed with two pairs of anchors and seven pairs of hooks.

Anchors, one pair dorsal and the other pair ventral, with superficial roots of each pair connected by a transverse bar; bars nonarticulate with each other. Parasitic on gills of freshwater fishes.

Urocleidus Mueller, 1934. Emended by Mizelle and Hughes, 1938

Synonyms; *Onchocleidus* Mueller, 1936, in part; *Tetracleidus* Mueller, 1936, in part; *Aristocleidus* Mueller, 1936, in part; *Haplocleidus* Mueller, 1937, in part; and *Pterocleidus* Mueller, 1937, in part.

Diagnosis: Tetraonchinae (Ancyrocephalinae) with trunk, eyes, gut, gonads, vitellaria, and haptoral bars as described for *Cleidodiscus.* Cirrus a cuticularized tube, straight or undulate, with or without a cirral fin or thread, infrequently corkscrew-like. Accessory piece never basally articulated with the cirrus. Vagina, when present, opening on the right margin near mid-length of trunk. Haptor generally distinct, subhexagonal; armed with two pairs of anchors and seven pairs of hooks. One pair of anchors dorsal, the other pair ventral, in position. Parasitic on gills of freshwater fishes.

As an additional character, Yamaguti (1963) states that the haptoral bars are similar in *Urocleidus* and dissimilar in *Cleidodiscus.*

Comparison of the characters of the two genera indicates that the morphology of the trunk, eyespots, gut, gonads, vitellaria, and haptoral bars is quite or nearly identical to that of *Cleidodiscus.*

It is readily ascertained that the haptor armaments of the two genera are very much alike in all respects. Each haptor contains two pairs of anchors, the bases of each pair supported by a transverse bar. The anchors are not articulated to each other in either case, and the anchors are located in the same portions of the haptors of both genera. All members of both genera possess 14 haptoral hooks, these hooks in each case being arranged in an essentially common spatial organization. Yamaguti's (1963) proposed differentiating factor of dissimilar bars in *Cleidodiscus* and similar ones in *Urocleidus* is not a valid one. Several species of *Cleidodiscus,* including the new species described later in this paper, possess bars very similar in shape. It thus appears that no significant differences in the haptoral armaments of these genera exist.

The presence or absence of a vagina can scarcely be considered a trait of generic magnitude. Mizelle and Hughes (1938) state that the absence of a vagina in North American fresh-water forms is not of generic significance since this condition sporadically occurs in several of the old genera.

A survey of North American monopisthocotylean Monogenea indicates without any serious question that position of the vagina is a poor generic trait. The vagina of *Cleidodiscus banghami*, for example, is dextral (Mizelle, 1940), whereas the vaginae are sinistral in all other congeneric species. In the genus *Dactylogyrus* the vagina has been reported as on the right ventral margin in *D. amblops* Mueller (1938), as being located near the midventral surface in *D. columbiensis* Monaco and Mizelle (1955), and as being sinistral and lateroventral in *D. vancleavei* Monaco and Mizelle (op. cit.).

In final analysis, only one character appears to differentiate *Cleidodiscus* and *Urocleidus*. The accessory piece is said to be basally articulated to the cirrus in *Cleidodiscus*, whereas the cirrus is not joined to the accessory piece in *Urocleidus*. The articulated accessory piece is apparently derived from ancestral forms possessing the non-articulated accessory piece. As it seems plausible that this character might furnish significant information of an evolutionary nature, both genera should stand, but with revised limits.

As concerns the species lacking an accessory piece entirely, it has not been established beyond question that any North American parasite related to either *Cleidodiscus* or *Urocleidus* actually lacks the accessory piece. If any such species do in fact exist, *Onchocleidus* Mueller, 1936, is available for their inclusion. *Onchocleidus* was established by Mueller to include *Urocleidus*-like forms which lacked an accessory piece, but Mizelle (1955) stated that an accessory piece has been observed in practically every species of *Onchocleidus* and probably exists in all of them.

As several species presently classified in *Cleidodiscus* possess accessory pieces which are apparently not actually articulated to the cirri, these forms should be transferred to *Urocleidus*. They will be known as *U. alatus* (Mueller, 1938), *U. brachus* (Mueller, 1938), *U. chautauquansis* (Mueller, 1938), *U. chavarriai* (E. Price, 1938), *U. megalonchus* (Mueller, 1936), and *U. travassoi* (E. Price, 1938).

For any worker of the opinion that the trait of an articulated or nonarticulated accessory piece does not exhibit enough importance to justify generic separation, the only alternative would be to synonymize *Cleidodiscus* and *Urocleidus.*

A NEW SPECIES OF *Cleidodiscus*

The author wishes to express his sincere thanks and appreciation to Mr. Emory Milner for a single host specimen of *Lepomis auritus* (Linnaeus) from his branch near Hollanville, Georgia. The branchial material and resultant parasites were treated as prescribed by C. Price and Mizelle (1964). Measurements were made as outlined by Mizelle and Klucka (1953) and are expressed in microns.

Cleidodiscus georgiensis sp. n.

Host and locality. Lepomis auritus (Linnaeus), the red-bellied sunfish; Milner's Branch, 3 miles SE of Hollanville, Georgia.

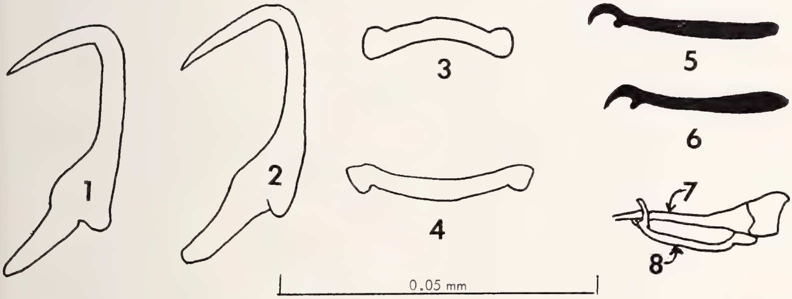
Number of specimens studied. Two.

Region of host's body inhabited by parasites. Gill filaments.

Types. Holotype deposited in the helminthological collection of the U. S. National Museum, accession no. 61201. Paratype in author's collection.

Description. Dactylogyridae, Ancyrocephalinae. A form of relatively small size provided with a thin, smooth cuticle devoid of scales or spines. Body constricted somewhat near mid-length. Body length 340 (322-358); greatest body width 63 (58-68), just anterior to constriction. Two pairs of eyespots, members of posterior pair much larger and somewhat closer together than other members. Comprising eyespot granules exhibit a slight tendency to dissociate; a few comprising granules scattered in the cephalic region. Pharynx subspherical in dorsal view; transverse diameter 16 (14-18). Peduncle short and narrow, with result that haptor is well set off from body proper. Haptor essentially subspherical in outline, with a somewhat irregular posterior border; length 83 (75-91), width 80 (76-84).

Two pairs of anchors, all members similar in both size and shape (Figs. 1-2). Each anchor composed of: (1) a solid base provided with a prominent superficial and a short deep root, (2) a solid shaft, joined to (3) a solid point. Shaft and point connect at a definite angle. Length of ventral anchor 37 (35-39), width of base 13 (12-14), length of dorsal anchor 36 (34-38), width of base 14 (13-15). Each of the haptoral bars simple and quite similar (Figs. 3-4). Length of ventral bar 20 (18-21), length of dorsal bar 23 (21-24).



Figs. 1-8. *Cleidodiscus georgiensis* sp. n., illustrating the major sclerotized structures. 1. Ventral anchor. 2. Dorsal anchor. 3. Ventral bar. 4. Dorsal bar. 5, 6. Haptoral hooks. 7. Cirrus. 8. Accessory piece.

Haptoral hooks 14 (seven pairs), similar in shape, subequal in size, and arranged in agreement with Mizelle and Crane (1964). (Figs. 5-6). Each hook composed of a solid base, a solid shaft, and a sickle-shaped termination provided with an opposable piece. Hook lengths: no. 1— 28; nos. 2, 4— 22; no. 3— 23; nos. 6, 7— 24; no. 5— 18.

Copulatory complex composed of a cirrus and an accessory piece (Figs. 7-8). Cirrus arises from an inflated base as a tube of narrow diameter, and opening ventrally; length 25 (23-28). Accessory piece basally articulated to cirrus; as the accessory piece shaft distally approaches the cirrus tube, it divides into two short rami of approximately equal length; length of accessory piece 18 (16-20). Vagina not observed with certainty. Testis postovarian. Vitellaria moderately well developed, forming two lateral bands. Intestinal crura confluent posteriorly.

It is difficult to determine which North American *Cleidodiscus* species most clearly resembles the present form. Several species of this genus possess haptoral armament similar to this new parasite, but none as yet described possesses a copulatory complex closely resembling that of *C. georgiensis.*

SUMMARY

The monogenetic trematode genera *Cleidodiscus* and *Urocleidus* are very nearly identical in morphology. The sole differentiating feature is the possession by *Cleidodiscus* of an accessory piece basally articulated to the cirrus; in *Urocleidus* the accessory piece is not joined to the cirrus base. Several species of *Cleidodiscus* are transferred to *Urocleidus* on that basis.

A new species, *Cleidodiscus georgiensis,* recovered from the gills of the red-bellied sunfish, *Lepomis auritus* (Linnaeus), is described.

LITERATURE CITED

MIZELLE, J. D. 1940. Studies on monogenetic trematodes. III. Redescriptions and variations in known species. Jour. Parasitol., vol. 26, no. 3, pp. 165-178.

———. 1955. Studies on monogentic trematodes. XIX. The status of North American Dactylogyrinae and Tetraonchinae. Proc. Indiana Acad. Sci., vol. 64, pp. 260-264.

MIZELLE, J. D., AND J. W. CRANE. 1964. Studies on monogentic trematodes. XXIII. Gill parasites of *Micropterus salmoides* (Lacépède) from a California pond. Trans. Amer. Micros. Soc., vol. 83, pp. 343-348.

MIZELLE, J. D., AND R. C. HUGHES. 1938. The North American freshwater Tetraonchinae. Amer. Midl. Nat., vol. 20, no. 2, pp. 341-353.

MIZELLE, J. D., AND A. R. KLUCKA. 1953. Studies on monogenetic trematodes. XIV. Dactylogyridae of Wisconsin fishes. Op. cit., vol. 49, no. 3, pp. 720-733.

MIZELLE, J. D., P. S. STOKLEY, B. J. JASKOSKI, A. P. SEAMSTER, AND L. H. MONACO. 1956. North American freshwater Tetraonchinae. Op. cit., vol. 55, no. 1, pp. 162-179.

MONACO, L. H., AND J. D. MIZELLE. 1955. Studies on monogenetic trematodes. The genus *Dactylogyrus.* Amer. Midl. Nat., vol. 53, no. 2, pp. 455-477.

MUELLER, J. F. 1936. Studies on North American Gyrodactyloidea. Trans. Amer. Micros. Soc., vol. 55, no. 1, pp. 55-72.

———. 1938. Additional studies on North American Gyrodactyloidea. Amer. Midl. Nat., vol. 19, no. 1, pp. 220-235.

PRICE, C. E. AND J. D. MIZELLE. 1964. Studies on mongenetic trematodes. XXVI. Dactylogyrinae from California with the proposal of a new genus, *Pellucidhaptor*. Jour. Parasitol., vol. 50, no. 4, pp. 572-578.

PRICE, E. W. 1938. The monogenetic trematodes of Latin America. *In* Livro Jubliar Prof. Travassos, Rio de Janeiro, Brazil, vol. 3, pp. 407-413.

VAN CLEAVE, H. J. AND J. F. MUELLER. 1932. Parasites of Oneida Lake fishes. Part 1. Descriptions of a new genera and new species. Roosevelt Wild Life Ann., vol. 3, no. 1, pp. 5-71.

YAMAGUTI, S. 1963. Systema helminthum. Vol. IV: Monogenea and Aspidocotylea. Interscience Publishers, New York, 699 pp.

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Quart. Jour. Florida Acad. Sci. 30(1) 1967 (1968)